Proceeding: WT Docket No. 04-356
WT Docket No. 02-353

To: Office of the Secretary
Federal Communications Commission
Washington, DC 20554

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The following comment is submitted in response to the FCC's request for comment relating to the tentative conclusion set forth in the "RF Safety" section of the Notice of Proposed Rule Making adopted September 9, 2004 in Docket Nos. 04-356 and 02-353 (paragraph 114). That section sets a threshold for environmental review of 1000 watts of effective radiated power ("ERP") and asserts that this will prevent human exposure to potentially unsafe levels of radio frequency ("RF") radiation in compliance with the National Environmental Policy Act (NEPA).

The FCC's November 25, 2003 Report and Order adopting the Rules for the 1710-1755 and 2110-2155 Mhz frequencies engaged in cursory evaluation of environmental considerations. The Report and Order provides:

> Background: In the AWS (advanced wireless services) Service Rules NPRM, we stated that our rules implementing [NEPA] are intended to prevent human exposure to potentially unsafe levels of [RF Radiation]. To that end, we noted that section 1.1307(b) of our rules requires preparation of [EA's] when licensees propose to construct fixed transmission facilities that exceed specified parameters. We indicated that exposure guidelines for the 2.3 GHz Wireless Communications Services (WCS) band are the same as those for spectrum at 1710-1755 MHz and 2110-2155 MHz. For WCS, we stated that the threshold for environmental review is an effective radiated power (ERP) greater than 1,000 watts.
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> Discussion: With regard to RF safety requirements, the commission adopted the 1,000 watts ERP threshold for 2.3.Ghz to recognize the flexibility with respect to use, power, location, and other factors that was accorded licensees operating in that band, and determined that this power limit was appropriate to ensure compliance with the Commission's RF exposure standards for most situations. Moreover, the Commission found the 1,000 watts ERP threshold consistent with its existing rules for transmitters and devices of comparable use and similar operating frequencies. For the same reasons, we adopt the 1,000 watts ERP safety threshold for fixed operations in the 1710-1755 and 2110-2155 MHz bands.

Report and Order, In the Matter of Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz bands, 18 F.C.C.R. 25162 at ¶¶ 132, 133 (Nov. 25, 2003

The FCC is proposing the same analysis in the 2004 NPRM: because the exposure limits are the same for the 1710-1755 MHz and 2110-2155 Mhz for the proposed new bands, the ERP safety threshold should be the same for the four new bands.

In the "Background" paragraph, the FCC notes that the rules implementing NEPA are intended to *prevent* human exposure to potentially unsafe levels. The "Discussion" paragraph, however, notes that the 1000 watt ERP threshold will ensure compliance with the Commission's RF exposure standards only in *most* situations.

Obviously, even the FCC recognizes that the 1000 watt ERP threshold proposed by the FCC does not fulfill the intent to prevent dangerous RF exposure that the FCC cites in the "Background" paragraph. The reason that the 1000 watt ERP threshold does not satisfy the intent is because ERP is the wrong parameter to specify.

Effective Radiated Power (ERP) is the product of Transmitter Power Output (TPO) and antenna gain (G). A 1000 watt ERP can be achieved with a 1 watt transmitter and an antenna gain of 1000. The same 1000 watt ERP can be obtained with a 1000 watt transmitter and an antenna gain of 1.

Even though both systems in the above paragraph have 1000 watt ERP, the system with the 1000 watt transmitter is much more likely to cause a hazardous RF exposure situation. This is because the RF power density of this system is much higher than that of the system that has low transmitter power and high antenna gain.

The situation to be avoided is high power density. The antenna with gain of 1000 has a much larger effective radiating area than the antenna with a gain of 1. The large radiating area of the high gain antenna, coupled with low total power results in low power density. The low gain antenna has a relatively small effective radiating area. This, coupled with high transmitter power, results in high power density. One can see that setting a 1000 watt ERP threshold in no way ensures that RF power densities will not exceed the Commission's RF exposure standards.

The FCC should select for a threshold a parameter that will ensure compliance with the Commission's RF exposure standards. Transmitter Power Output would be such a parameter.

Date November 23, 2004

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